

REMARKS

In response to the Examiner's Action mailed on November 24, 2003, claims 15, 16, 18, 21, 23, 25, 30 to 32, and 37 are amended. The applicants
5 hereby respectfully request that the patent application be reconsidered.

An item-by-item response to Examiner's objections or rejections is provided in the followings:

10 **I. Rejection of Claims Under 35 USC § 103**

A) The Examiner rejects claims 15 and 17 under 35 U.S.C. 103(a) as being unpatentable over Robbins USPN 4,788,523 in view of Zadman et al. USPN 4,677,413. According to the Examiner, Robbins discloses in fig. 7 a
15 resistor array comprising a plurality of resistors 234 comprising a base; a plurality of electrodes 222 composed of conductive material disposed directly on said base which could be employed for connecting each of said resistors to external circuits wherein said base between every two of said electrodes having a precisely controlled distance for providing a precisely
20 defined resistance for each of said resistors, but does not disclose a metallic bulk base. Zadman et al disclose (see figs. 8-11 and col. 5, lines 32-47) a precision resistor disposed on metallic bulk base 3. Therefore, it would have obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Zadman et al with Robbins' device
25 since that would provide an improved heat dissipation as taught by Zadman et al. As to claim 17, Robbins discloses a plurality of scribing lines disposed between said resistors for scribing said resistor array into a plurality of resistors each comprising at least two electrodes that could be employed for connecting each of said resistors to external circuits.

30

In response to the rejections, claim 15 is amended to direct to a resistor array that includes:

March 23, 2004

- a) a plurality of resistors each comprising a metallic bulk base;
- b) a plurality of electrodes composed of conductive material disposed directly on said metallic bulk base for connecting each of said resistors to external circuits wherein said metallic bulk base
5 constituting a single layer electrically conductive medium
between every two of said electrodes having a
lithographically-defined precisely controlled distance for providing a precisely defined resistance for each of said resistors.

10 Neither Robins nor Zadman disclose a resistor with a metallic base that constitutes a single layer electrically conductive medium between two electrodes. The resistors disclosed in Robins or Zadman includes a thin film layer disposed on a substrate. Even that the substrate may be a metallic substrate; the metallic substrate does not constitute a single layer
15 electrically conductive medium between two electrodes having a lithographically defined precisely controlled distance. Therefore, the amended claims 15 and all the dependent claims are non-obvious over the disclosures as made by Robins and Zadman.

20 B). The Examiner further rejects Claim 30 under 35 U.S.C. 103(a) as being unpatentable over Robbins US No. 4,788,523 in view of Zadman et al. USPN 4,677,413. According to the Examiner, Robbins discloses in fig. 7 a resistor comprising a plurality of resistors 234 comprising a base which could be employed for connecting each of said resistors to external
25 circuits; at least electrodes 222 composed of conductive material disposed directly on said base wherein said base between said two of said electrodes having a precisely controlled distance for providing a precisely defined resistance for each of said resistor, but does not disclose a metallic bulk base. Zadman et al disclose (see figs. 8-11 and col.. 5, lines 32-47) a
30 precision resistor disposed on metallic bulk base 3. Therefore, it would have obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Zadman et al with Robbins' device since

March 23, 2004

that would provide an improved heat dissipation as taught by Zadman et al.

In response to the rejection, claim 30 is amended to direct to a resistor that includes:

- 5 a) a metallic bulk base; and
 b) at least two electrodes composed of a conductive material disposed directly on said metallic bulk base for connecting said resistor to external circuits wherein said metallic bulk base constituting a single layer electrically conductive medium and having a
10 lithographically-defined precisely controlled distance between said two electrodes for providing a precisely defined resistance for said resistor.

15 As discussed above, none of the disclosures made in Robins or Zadman provide such resistors. The amended claim 30 and all the dependent claims would be non-obvious over the cited prior art references.

20 C) The Examiner further rejects Claims 18 and 32 under 35 U.S.C. 103(a) as being unpatentable over Robbins in view of Zadman et al. as applied to claims 15 and 30 above, and further in view of Thomas et al. (J. Vac. Sci. Technol., Vol. 13, No. 1, Jan/Feb. 1976). According to the Examiner, the combined references disclose all the claimed subject matter but do not specifically disclose a nickel-copper alloy metallic material.
25 Thomas et al. disclose in fig. 2 a low TCR metallic material composed of a metal plate comprising a nickel-copper alloy. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use a nickel-copper alloy metallic material, since having a metallic material comprising same material as a resistor/electrode would save
30 material thereby reducing cost.

In response to the rejections, claims 18 and 32 are amended to direct to a resistor array and a resistor wherein:

March 23, 2004

said metallic bulk base constituting said single layer electrically conductive medium comprising a nickel-copper alloy.

5 As discussed above, neither Robins nor Zadman disclose a resistor or resistor array that has a metallic bulk base that constitutes a single layer electrically conductive layer between the electrodes. Further disclosed by Thomas, et. al, the resistors are resistive films consisted of nickel-copper alloy coated on ceramic substrate. None of the cited prior art reference has the metallic bulk base as the single layer electrically conductive
10 medium between the electrodes. Therefore, the amended claims 18 and 32 would be non-obvious and patentable.

D) The Examiner rejects claims 20-22 mid 34-36 under 35 U.S.C. 103(a) as being unpatentable over Robbins in view of Zadman et al. as applied to
15 claims 15 and 30 above, and farther in view Sone et al. (JP 2000-173801). According to the Examiner, the combined references fail to specifically disclose resistors having resistance ranging approximately from one millie-ohm to one ohm. Sone et al disclose in figs. 1-10 plurality of electrode columns disposed on a metal plate having a precisely defined
20 position for providing precisely defined resistance for each resistors. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to dispose metal plate having a precisely defined position for providing precisely defined resistance for each resistors, since it has been held that where the general conditions of a
25 claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. As to claims 21, 22, 35 and 36, Sone et al disclose low resistance resistors could be achieved by adjusting dimensions of certain elements of the device. Robins discloses a length of a resistor of about 2.54 mm. Therefore,
30 it would have been obvious to one ordinary skill in the art at the time the invention was made to use electrodes and resistors of a suitable dimensions, since it has been held that where the general conditions of a

claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

5 As discussed above, the basic claims are amended to include an additional limitation where the metallic bulk base constitutes a single layer electrically conductive medium between the electrodes and the distance between the electrodes is lithographically defined. None of the above references disclose the inventions as now directed by the amended claims, therefore, the amended claims would not be obvious over all the
10 cited prior art references.

E) The Examiner further rejects claims 19 and 33 under 35 U.S.C. 103(a) as being unpatentable over Robbins in view of Zadman et al. as applied to claims 15 and 30 above, and farther in view Shimada (JP 8-
15 22903). According to the Examiner, the combined references fail to specifically disclose an electrode layer disposed on each of said electrodes comprising a copper layer and a tin-lead alloy layer on each of said electrode column. Sbimada discloses an electrode layer disposed on each of electrode columns 2 comprising a copper layer 7 and a tin-lead alloy
20 layer 9 on each of said electrode columns. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a copper layer and a tin-lead alloy layer on each of said electrode columns, since that would control solder wetting degradation and improves background surface of nickel plating.

25 As discussed above, the basic claims are amended to include an additional limitation where the metallic bulk base constitutes a single layer electrically conductive medium between the electrodes and the distance between the electrodes is lithographically defined. None of the
30 above references disclose the inventions as now directed by the amended claims, therefore, the amended claims would not be obvious over all the cited prior art references.

March 23, 2004

5 F) The Examiner further rejects claims 23-25 under 35 U.S.C. 103(a) as being unpatentable over Robbins in view of Zadman et al and Thomas et al. (J. Vac. Sci. Technol., Vol. 13, No. 1, Jan¹Feb. 1976). According to the Examiner, Robbins discloses in fig. 7 a resistor array comprising a plurality of resistors 234 each comprising a base; a plurality of column-shaped electrodes disposed directly on said base which could be employed for connecting each of said resistors to external circuits and having a precisely controlled distance for providing a precisely defined resistance for each of said resistor, but does not disclose a metallic bulk base or electroplated electrodes. Zadman et al disclose (see figs. 8-11 and 10 col. 5, lines 32-47) a precision resistor disposed on metallic bulk base 3. Therefore, it would have obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Zadman et al with Robbins' device since that would provide an improved heat dissipation as 15 taught by Zadman et al. Thomas et al disclose electroplated electrodes composed of low TCR metallic material. It would have been obvious to one skilled in the art at the time the invention was made to use electroplated electrodes, since that would provide the capability of reducing a conductor resistance. As to claim 24, Robbins discloses a 20 plurality of scribing lines disposed between said resistors for scribing said resistor array into a plurality of resistors each comprising at least two electrodes which could be employed for connecting each of said resistors to external circuits. As to claim 25, Thomas et al. disclose in fig. 2 a metallic material composed of a metal plate comprising a nickel-copper 25 alloy.

As discussed above, the basic claims are amended to include an additional limitation where the metallic bulk base constitutes a single layer electrically conductive medium between the electrodes and the distance between the electrodes is lithographically defined. None of the 30 above references disclose the inventions as now directed by the amended claims, therefore, the amended claims would not be obvious over all the cited prior art references.

March 23, 2004

G) The Examiner further rejects claims 37 and 38 under 35 U.S.C. 103(a) as being unpatentable over Robbins in view of Zadman et al and Thomas et al. (J. Vac. Sci. Technol., Vol. 13, No. 1, Jan/Feb. 1976).

According to the Examiner, Robbins discloses in fig. 7 a resistor
5 comprising a plurality of resistors 234 each comprising a base; at least two column-shaped electrodes 222 disposed directly on said base which could be employed for connecting each of said resistors to external circuits and having a precisely controlled distance for providing a precisely defined resistance for each of said resistor, but does not disclose a metallic bulk
10 base or electroplated electrodes. Zadman et al disclose (see figs. 8-11 and col. 5, lines 32-47) a precision resistor disposed on metallic bulk base 3. Therefore, it would have obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Zadman et al with Robbins' device since that would provide an improved heat dissipation as
15 taught by Zadman et al. Thomas et al disclose electroplated electrodes composed of low TCR metallic material. It would have been obvious to one skilled in the art at the time the invention was made to use electroplated electrodes, since that would provide the capability of reducing a conductor resistance. As to claim 38, Thomas et al. disclose in
20 fig. 2 metallic material composed of a metal plate comprising a nickel-copper alloy.

As discussed above, the basic claims are amended to include an additional limitation where the metallic bulk base constitutes a single
25 layer electrically conductive medium between the electrodes and the distance between the electrodes is lithographically defined. None of the above references disclose the inventions as now directed by the amended claims, therefore, the amended claims would not be obvious over all the cited prior art references.

30

March 23, 2004

H) The Examiner further rejects claims 27-29 and 40-42 under 35 U.S.C. 103(a) as being unpatentable over Robbins in view of Zadman et al and Thomas et al as applied to claims 23 and 37 above, and farther in view of Sone et al. (JP 2000-173801). According to the Examiner, the combined
5 references fail to specifically disclose resistors having resistance ranging approximately from one milli-ohm to one ohm. Sone et al disclose in figs. 1-10 precisely defined resistance for each resistor. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to dispose metal plate having a precisely defined position for
10 providing precisely defined resistance for each resistors, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. As to claims 28, 29, 41 and 42, Sone et al. disclose low resistance resistors could be achieved by adjusting
15 dimensions of certain elements of the device. Robbins discloses a length of a resistor of about 2.54 mm. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use electrodes and resistors of a suitable dimensions, since it has been held that where the general conditions of a claim are disclosed in the prior art,
20 discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As discussed above, the basic claims are amended to include an additional limitation where the metallic bulk base constitutes a single
25 layer electrically conductive medium between the electrodes and the distance between the electrodes is lithographically defined. None of the above references disclose the inventions as now directed by the amended claims, therefore, the amended claims would not be obvious over all the cited prior art references.

30

March 23, 2004

I). The Examiner rejects claims 26 and 39 under 35 U.S.C. 103(a) as being as being unpatentable over Robbins in view of Zadman et al and Thomas et al as applied to claims 23 and 37 above, and farther hi view of Shimada (JP 8-22903). According to the Examiner, the combined
5 references fail to specifically disclose column-shaped electroplated electrode comprising a copper layer and a tin-lead alloy layer. Shimada discloses electroplated electrode comprising a copper layer 7 and a tin-lead alloy layer 9. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ a copper layer and. a
10 tin-lead alloy layer, since that would control solder wetting degradation and improves background surface of nickel plating.

As discussed above, the basic claims are amended to include an additional limitation where the metallic bulk base constitutes a single
15 layer electrically conductive medium between the electrodes and the distance between the electrodes is lithographically defined. None of the above references disclose the inventions as now directed by the amended claims, therefore, the amended claims would not be obvious over all the cited prior art references.

20

II. Allowable Subject Matter

The Examiner objects to claims 16 and 31 as being dependent on a rejected base claim. The Examiner further instructs that these claims
25 would be allowable if rewritten as independent form including all of the limitations of the base claim and the intervening claims.

Claims 16 and 31 are amended as independent claim to include all the limitation of the base claims, i.e., claim 15 and claim 30 respectively.
30 The amended claims 16 and 31 are now allowable.

March 23, 2004

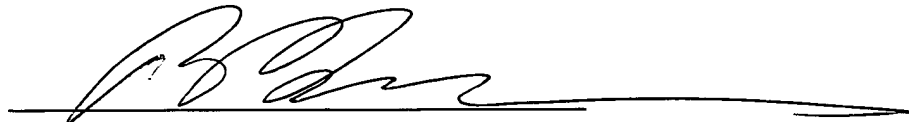
With the amended drawings, the canceled and amended claims,
and the reasons provided above, applicants hereby respectfully request
that Examiner's rejections under 37 CFR §103 be withdrawn and the
present application be allowed.

5

Respectfully submitted,
Horng-Yih Juang, et al

10

By

A handwritten signature in black ink, appearing to read 'Bo-In Lin', is written over a horizontal line.

Bo-In Lin -- Attorney, Registration No. 33,948
13445 Mandoli Drive, Los Altos Hills, CA 94022
(650) 949-0418 (Tel), (650) 949-4118 (Fax)

15

March 23, 2004